Code No: P18CST03 R18

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH/APRIL - 2023
Mathematical Foundation of Computer Science
(Common to IT, AIML Branches)

Time: 3 hours Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

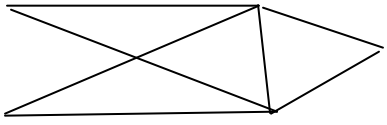
Answer all the questions in Part-A (5X2=10M)

Q.No.		Questions	Marks	CO	KL
1	a)	List all implications in statement calculus.	[2M]	1	
	b)	Define compatibility relation?	[2M]	2	
	c)	Compute 8_{p_5} *and* 6_{p_3} .	[2M]	3	
	d)	Write about partial fraction decomposition.	[2M]	4	
	e)	What are bipartite graphs?	[2M]	5	

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
2.	a)	Assume x is a particular real number. Determine whether the following two statements are logically equivalent. (i) x<2 or it is not the case that 1<x<3 (ii) x≤1or either x<2 or x≥3.	[5M]	1	
	b)	Prove that the following argument is valid: No engineers are fools. No one who is not a fool is an administrator. Kumar is an engineer. Therefore Kumar is not an administrator.	[5M]	1	
		OR			
3.	a)	Find the truth table for the propositional formula:(p↔q) ↔(q→p).	[5M]	1	
	b)	Explain pcnf and find pcnf of the formula (¬P → R) Λ (Q ↔P) .	[5M]	1	
		UNIT-II			
4.	a)	Let f = $\begin{pmatrix}1&2&3&4\\2&4&1&3\end{pmatrix}$and g = $\begin{pmatrix}1&2&3&4\\4&1&2&3\end{pmatrix}$ find (f o g) and (g o f).	[5M]	2	
	b)	Let X = {1,2,3,4} be a set and R is a relation on the set X such that R = {(1,1),(1,4),(4,1),(4,4),(2,2),(2,3),(3,2),(3,3)}.Draw its matrix and graph. Also prove that R is an equivalence relation.	[5M]	2	
		OR			
5.	a)	Let A={1, 2,3 ,4} and f and g be functions from A to A given by f={(1,4), (2,1), (3,2),(4,3)} and g={ (1,2), (2,3), (3,4), (4,1) prove that f and g are inverse of each other.	[5M]	2	
	b)	Explain in brief about Inversive and Recursive functions with examples.	[5M]	2	
		UNIT-III			
6.	a)	Find the coefficient of $x^9 y^3$ in the expansion of $(2x - 3y)^{12}$.	[5M]	3	
	b)	In any group (G,*), by proving the inverse of every element is unique.	[5M]	3	
		OR			

7.	a)	Find the number of permutations of the EVERGREEN word?	[5M]	3	
	b)	Let G={-1,0,1}. Verify that G forms an abelian group under addition?	[5M]	3	
		UNIT-IV			
8.		Suppose a continuous random variable x has the probability of has the probability density function is $f(x) = k(1-x^2)$ for $0<x<1$ then find (i) k (ii) Mean and (iii) variance	[10M]	4	
		OR			
9.	a)	Solve the recurrence relation $a_n - 6\,a_{n-1}+9\,a_{n-2}= 0$ for $n>=2$ given $a_0= 5$, $a_1=12$.	[5M]	4	
	b)	Solve the recurrence relation $a_{n+2} -4a_n=9n^2$.	[5M]	4	
		UNIT-V			
10.	a)	Define Eulerian circuit and Hamiltonian circuit, give an example of graph that has neither Eulerian circuit nor Hamiltonian circuit.	[5M]	5	
	b)	Explain isomorphism of two graphs with suitable example.	[5M]	5	
		OR			
11.	a)	Explain Kruskal's algorithm to find minimal spanning tree of the graph with suitable example. Find minimal spanning tree for the given graph. 	[5M]	5	
	b)	Explain about DFS and write the algorithm of DFS with example.	[5M]	5	

******